BRUHAT BANGALORE MAHANAGARA PALIKE
BYATARAYANPURA DIVISION

Project Name: Package No.01 (Package consists of 18 works)

Name of Work

1.Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division.

2.Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division

3.Improvement to Drains and Asphalting to Road at SVN School Road Krishnappa House to Venkatesh House Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division.

4.Improvement to Roads and Drains at Hunnasemarada Krishnappa Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division.

5. Improvement of Drains and Asphalting to Road at Rachenahali Circle to Burial Ground in Ward No.06(Thanisandra), Byatarayanapura Sub Division.

6.Improvement of Drains and Asphalting to Road at Bhuvaneshwarinagara Cross Roads in Ward No.06(Thanisandra), Byatarayanapura Sub Division.

FOURTH & FINAL BILL

TEST REPORTS

TEJUS CONSULTANTS
CONSULTING ENGINEERS AND DESIGNERS
No.58 MIG, 6th Cross, 3rd Main
1st Stage, Basaveshwaranagar
Bangalore-560079
☎ 080 - 23287532
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TEJUS
CONSULTANTS

No. TC / BBMP / RI / BYT-PMC / 502 / 21-22 Date:

To
The Executive Engineer
Byatarayanapura Division,
Bruhat Bangalore Mahanagara Palike,
Bangalore.

Dear Sir

Sub: **Package No.01 (Package consists of 18 works).**

In reference to the above subject, this is to bring to your kind notice that we have scrutinized the **Fourth and Final bill** submitted by Sri D Narahari, Bangalore, towards the above said work and arrived at an amount of **Rs. 3,74,87,147.18/- (Rupees Three Crore Seventy Four Lakh Eighty Seven Thousand One Hundred Forty Seven and Paise Eighteen Only**). The work has been completed satisfactorily.

This is for your kind information.

Thank you and assuring you the best of our Services at all the times

For Tejus Consultants
(Nischal M)

TEJUS CONSULTANTS
No. 58, 3rd main, 6th Cross, 1st Stage KHB Colony, Basaveshwaranagar, Bangalore - 560079. ☐ +91 80 23287532, tejusconsultants@gmail.com

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

Project	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	Bruhat Bengaluru Mahanagara Palike		
Consultant	TEJUS CONSULTANTS, Basaveshwar Nagar Bangalore		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Proposed Use	WMM	**Date of Sampling**	18.10.2020
Sample Location	Sanchar nagar,MCECHS layout	**Date of Testing**	19.10.2020

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	359.00	351.00	329.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	275.00	268.00	250.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	84.00	83.00	79.00	
4	Aggregate Impact Value (%)	(Wc/Wa)*100	23.40	23.65	24.01	
5	Average Aggregate impact value	(%)	23.69			Max - 30 %

Remarks : ✓ Satisfactory / Not Satisfactory

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3. Any Query regarding the report must be reported reported within 15days from the date of testing.
4. The material used in the site satisfied the standard of MORTH's 5th revision and hence can be used in the work.

Authorised Signatory

ಸಹಾಯಕ ಅಭಿಯಂತರರು
ಬಿ.ಬಿ.ಎಂ.ಪಿ ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ

ಪಾಲಿಕೆ ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬಿ.ಬಿ.ಎಂ.ಪಿ., ಬೆಂಗಳೂರು-26

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

TEJUS CONSULTANTS

Project	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bengaluru Mahanagara Palike
Consultant	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	Kateramma temple opp rd	**Date of Sampling**	18.10.2020
		Date of Testing	19.10.2020

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	627	85	523	81
16.0	12.5	1120	114	1005	117
12.5	10.0	770	62	721	55
10.0	6.3	619	60	559	41
Total		**3136**	**321**	**2808**	**294**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.24
Elongation Index(%):	10.47
Combined FI+EL (%)	20.71

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bengaluru Mahanagara Palike
Consultant	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	Sanchar nagar,MCECHS layout	**Date of Sampling**	18.10.2020
		Date of Testing	19.10.2020

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	627	84	522	80
16.0	12.5	1120	115	1002	116
12.5	10.0	760	61	720	54
10.0	6.3	650	61	650	40
Total		**3157**	**321**	**2894**	**290**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.17
Elongation Index(%):	10.02
Combined FI+EL (%)	20.19

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	19.10.2020
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	Sanchar nagar, MCECHS layout	**Date of Sampling:**	18.10.2020
		Date of testing:	19.10.2020
Type of material & Purpose:	WMM	**Oven Dry Wt.(gms):**	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	382	382	3.82	96.18	95-100
22.4	2415	2797	27.97	72.03	60-80
11.2	2521	5318	53.18	46.82	40-60
4.75	1429.0	6747	67.47	32.53	25-40
2.36	893.0	7640	76.40	23.60	15-30
0.6	821.0	8461	84.61	15.39	8.0-22.0
0.075	941.0	9402	94.02	5.98	0-8
Pan	598.0	10000			
Total	10000.0				

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Consultant's Representative

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ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬಿ.ಬಿ.ಎಂ.ಪಿ, ಬೆಂಗಳೂರು-26

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	19.10.2020
Type of Mix	:	WMM
Sample I/D	:	WMM 2

Sample Location:	Sanchar nagar, MCECHS layout	**Date of Sampling:**	18.10.2020
		Date of testing:	19.10.2020
Type of material & Purpose:	WMM	**Oven Dry Wt.(gms):**	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	381	381	3.81	96.19	95-100
22.4	2413	2794	27.94	72.06	60-80
11.2	2520	5314	53.14	46.86	40-60
4.75	1430.0	6744	67.44	32.56	25-40
2.36	892.0	7636	76.36	23.64	15-30
0.6	820.0	8456	84.56	15.44	8.0-22.0
0.075	940.0	9396	93.96	6.04	0-8
Pan	604.0	10000			
Total	10000.0				

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Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)			
Project	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Date of Testing	24.10.2020		
Layer no. or level	WMM I layer		
Depth of hole	250mm		
Field density:	**1**	**2**	**3**
Chainage	**Sanchar nagar,MCECHS layout (10th Main Rd)'@55**	**Sanchar nagar,MCECHS layout (10th Main Rd)'@110**	**Sanchar nagar,MCECHS layout (11th Main Rd)'@80**
Wt. of wet material from hole (Ww) gms.	6165	6115	6212
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9732	9736	9725
Wt. of sand in cone (w3) gms.	837	848	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3431	3416	3439
Bulk density of sand (ys)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (yb)=(Ww/w4*(ys))gm/cc	2.35	2.36	2.37
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100yb/100+mc)gm/cc	2.09	2.10	2.10
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.28	98.56	98.69
Compaction Required	98%	98%	98%

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Authorised Signatory

tejusconsultants@gmail.com

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Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)			
Project	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Date of Testing	24.10.2020		
Layer no. or level	WMM I layer		
Depth of hole	250mm		
Field density:	**1**	**2**	**3**
Chainage	**Sanchar nagar,MCECHS layout (9th B Main Rd)'@58**	**Sanchar nagar,MCECHS layout (9th B Main Rd)'@108**	**Sanchar nagar,MCECHS layout (9th A Main Rd)'@60**
Wt. of wet material from hole (Ww) gms.	6158	6121	6235
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9736	9733	9704
Wt. of sand in cone (w3) gms.	835	845	838
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3429	3422	3458
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.35	2.36	2.36
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.09	2.10	2.10
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.22	98.48	98.51
Compaction Required	98%	98%	98%

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Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)			
Project	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Date of Testing	24.10.2020		
Layer no. or level	WMM I layer		
Depth of hole	250mm		
Field density:	**1**	**2**	**3**
Chainage	**Katerammma Temple Opp Rd @Ch 25**	**Katerammma Temple Opp Rd @Ch 60**	**Sanchar nagar,MCECHS layout (10th A Main Rd)'@60**
Wt. of wet material from hole (Ww) gms.	6155	6118	6230
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9731	9730	9702
Wt. of sand in cone (w3) gms.	834	844	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3435	3426	3462
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.35	2.36	2.36
Moisture meter reading(moisture content)	12.40	12.55	12.45
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.09	2.09	2.10
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.05	98.33	98.42
Compaction Required	98%	98%	98%

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Project	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bengaluru Mahanagara Palike
Consultant	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

AGGREGATE IMPACT VALUE (IS: 2386 Part - 4)

Proposed Use	BC	**Date of Sampling**	**30-06-2021**
Sample Location	At plant	**Date of Testing**	**30-06-2021**

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	365.00	349.00	377.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	280.00	267.00	289.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	85.00	82.00	88.00	
4	Aggregate Impact Value (%)	(Wc/Wa)*100	23.29	23.50	23.34	
5	Average Aggregate impact value	(%)	23.38			Max - 30 %

Remarks : ✓ Satisfactory / Not Satisfactory

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Consultant's Representative

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Project	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No 06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bengaluru Mahanagara Palike
Consultant	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Type of Material	BC		**Proposed Use**	BC
Sample Location	At plant		**Date of Sampling**	30-06-2021
			Date of Testing	30-06-2021

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	942	85	932	77
16.0	12.5	1318	112	1252	128
12.5	10.0	522	74	445	54
10.0	6.3	490	62	435	64
Total		**3272**	**333**	**3064**	**323**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.18
Elongation Index(%):	10.54
Combined FI+EL (%)	20.72

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

Name of Work	:	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt Ltd.
Date of Testing	:	02-07-2021
Type of Mix	:	BC
Sample I/D	:	BC1

DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
1. Weight of Mixture before extraction, g	902	918
2. Weight of Mixture after extraction, g	855	870
3. Weight of Bitumen	47	48
4. Weight of filter paper before extraction, g	2.00	2.15
5. Weight of filter paper after extraction, g	4.10	4.00
6. Weight of fines, g	2.10	1.85
7. Weight of Bitumen & fines	49.10	49.85
8. Bitumen content in %	5.44	5.43
9. Average Bitumen content in %	**5.44**	
10. Minimum Bitumen content in %	**5.40**	

GRADATION FOR BC AFTER EXTRACTION

(As per MORT&H 500-18,Grading-2)

Sample Location:	10th main road,Sanchar nagar,MCECHS layout	Date of Sampling:	02-07-2021
		Date of testing:	02-07-2021
Type of material & Purpose:	BC	Oven Dry Wt.(gms):	855.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	83	83.0	9.71	90.29	79 - 100
9.50	105	188.0	21.99	78.01	71 - 95
4.75	102	290.0	33.92	66.08	53 - 71
2.360	111	401.0	46.90	53.10	42 - 58
1.180	105	506.0	59.18	40.82	34 - 48
0.600	95	601.0	70.29	29.71	26 - 38
0.300	60	661.0	77.31	22.69	18 - 28
0.150	52	713.0	83.39	16.61	12 - 20
0.075	88	801.0	93.68	6.32	4 - 10
Pan	54.0	855.0			
Total	855.0				

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ಸಹಾಯಕ ಅಭಿಯಂತರರು
ಬಿ.ಬಿ.ಎಂ.ಪಿ. ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬಿ.ಬಿ.ಎಂ.ಪಿ., ಬೆಂಗಳೂರು-26

Consultant's Representative

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TEJUS
CONSULTANTS

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

Name of Work	:	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	02-07-2021
Type of Mix	:	BC
Sample I/D	:	BC2

DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
1. Weight of Mixture before extraction, g	948	892
2. Weight of Mixture after extraction, g	898	845
3. Weight of Bitumen	50	47
4. Weight of filter paper before extraction, g	2.00	2.15
5. Weight of filter paper after extraction, g	4.10	4.00
6. Weight of fines, g	2.10	1.85
7. Weight of Bitumen & fines	52.10	48.85
8. Bitumen content in %	5.50	5.48
9. Average Bitumen content in %	**5.49**	
10. Minimum Bitumen content in %	**5.40**	

GRADATION FOR BC AFTER EXTRACTION

(As per MORT&H 500-18,Grading-2)

Sample Location:	11th main road,Sanchar nagar	Date of Sampling:	02-07-2021
		Date of testing:	02-07-2021
Type of material & Purpose:	BC	Oven Dry Wt.(gms):	898.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	82	82.0	9.13	90.87	79 - 100
9.50	115	197.0	21.94	78.06	71 - 95
4.75	98	295.0	32.85	67.15	53 - 71
2.360	142	437.0	48.66	51.34	42 - 58
1.180	115	552.0	61.47	38.53	34 - 48
0.600	72	624.0	69.49	30.51	26 - 38
0.300	78	702.0	78.17	21.83	18 - 28
0.150	52	754.0	83.96	16.04	12 - 20
0.075	73	827.0	92.09	7.91	4 - 10
Pan	71.0	898.0			
Total	898.0				

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Consultant's Representative

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No. 58, 3rd main, 6th Cross, 1st Stage KHB Colony, Basaveshwaranagar, Bangalore - 560079, O: +91 80 23287532, tejusconsultants@gmail.com

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TEJUS
CONSULTANTS

DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers & Project Pvt.Ltd.
Date of Testing :	02-07-2021
Type of Mix :	Tack coat
Sample I/D :	1
Sample Location	10th main road,Sanchar nagar,MCECHS layout

Determination	**Unit**	**Test No**		
		1	**2**	**3**
Chainage		**@30**	**@75**	**@110**
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.774	0.765	0.795
Final weight of plate after application of tack Coat (c)	Kg	0.797	0.788	0.818
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.023
Rate of spread of tack coat	Kg/sq.m	0.251	0.253	0.250
Average	Kg/sq.m	0.251		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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DETERMINATION OF RATE OF SPREAD TACK COAT				
Name of Work :	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division			
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE			
Consultant :	M/s Tejus Consultants			
Contractor :	Benaka Developers & Project Pvt.Ltd.			
Date of Testing :	2-07-2021			
Type of Mix :	Tack coat			
Sample I/D :	2			
Sample Location	11th main road,Sanchar nagar			
Determination	**Unit**	**Test No**		
		1	**2**	**3**
Chainage		**@25**	**@50**	**@105**
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.786	0.767	0.802
Final weight of plate after application of tack Coat (c)	Kg	0.809	0.790	0.825
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.023
Rate of spread of tack coat	Kg/sq.m	0.251	0.256	0.251
Average	Kg/sq.m	0.253		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers & Project Pvt.Ltd.
Date of Testing :	2-07-2021
Type of Mix :	Tack coat
Sample I/D :	3
Sample Location	9th ' B'Main road,Sanchar nagar(MCECHS)

Determination	**Unit**	**Test No**		
		1	**2**	**3**
Chainage		**@35**	**@80**	**@120**
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.754	0.736	0.765
Final weight of plate after application of tack Coat (c)	Kg	0.777	0.759	0.788
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.023
Rate of spread of tack coat	Kg/sq.m	0.254	0.256	0.252
Average	Kg/sq.m	0.254		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers & Project Pvt.Ltd.
Date of Testing :	2-07-2021
Type of Mix :	Tack coat
Sample I/D :	4
Sample Location	8th 'A' Main road,Sanchar nagar

Determination	**Unit**	**Test No**		
		1	**2**	**3**
Chainage		**@45**	**@70**	**@110**
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.752	0.764	0.782
Final weight of plate after application of tack Coat (c)	Kg	0.775	0.787	0.805
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.023
Rate of spread of tack coat	Kg/sq.m	0.254	0.253	0.251
Average	Kg/sq.m	0.253		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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ಸಹಾಯಕ ಆಧಿಯವರವರು
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ಸಹಾಯಕ ಕಾರ್ಯನಿರ್ವಾಹಕ ಅಧಿಕಾರಿ
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers & Project Pvt.Ltd.
Date of Testing :	2-07-2021
Type of Mix :	Tack coat
Sample I/D :	5
Sample Location	8th 'A' Main road,Sanchar nagar

Determination	**Unit**	**Test No**		
		1	**2**	**3**
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.762	0.748	0.750
Final weight of plate after application of tack Coat (c)	Kg	0.785	0.771	0.773
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.023
Rate of spread of tack coat	Kg/sq.m	0.254	0.252	0.250
Average	Kg/sq.m	0.252		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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DETERMINATION OF RATE OF SPREAD TACK COAT				
Name of Work :	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division			
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE			
Consultant :	M/s Tejus Consultants			
Contractor :	Benaka Developers & Project Pvt.Ltd.			
Date of Testing :	2-07-2021			
Type of Mix :	Tack coat			
Sample I/D :	5			
Sample Location	8th 'A' Main road,Sanchar nagar			
Determination	**Unit**	**Test No**		
		1	**2**	**3**
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.762	0.748	0.750
Final weight of plate after application of tack Coat (c)	Kg	0.785	0.771	0.773
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.023
Rate of spread of tack coat	Kg/sq.m	0.254	0.252	0.250
Average	Kg/sq.m	0.252		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvements to Road and Drains at Thanisandra Munisonnegowda Layout in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers & Project Pvt.Ltd.
Date of Testing :	2-07-2021
Type of Mix :	Tack coat
Sample I/D :	6
Sample Location	8th 'A' Main road,Sanchar nagar

Determination	**Unit**	**Test No**		
		1	**2**	**3**
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.766	0.738	0.749
Final weight of plate after application of tack Coat (c)	Kg	0.789	0.761	0.772
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.023
Rate of spread of tack coat	Kg/sq.m	0.251	0.253	0.250
Average	Kg/sq.m	0.251		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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BRUHAT BANGALORE MAHANAGARA PALIKE
BYATARAYANPURA DIVISION

Project Name: Package No.01 (Package consists of 18 works)

Name of Work

2.Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division.

FOURTH & FINAL BILL

TEST REPORTS

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TEJUS

AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	Bruhat Bengaluru Mahanagara Palike		
Consultant	TEJUS CONSULTANTS, Basaveshwar Nagar Bangalore		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Proposed Use	WMM	**Date of Sampling**	24-08-2021
Sample Locati	**Maruthinagar cross Roads**	**Date of Testing**	25-08-2021

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	365.00	367.00	350.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	267.00	269.00	249.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	98.00	98.00	101.00	
4	Aggregate Impact Value (%)	(Wc/Wa)*100	26.85	26.70	28.86	
5	Average Aggregate impact value	(%)	27.47			Max - 30 %

Remarks : Satisfactory / Not Satisfactory

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra). Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	25-08-2021
Type of Mix	:	WMM
Sample I/D	:	WMM 4

Sample Location:	Maruthinagar 8th cross Rd	Date of Sampling:	24-08-2021
		Date of testing:	25-08-2021
Type of material & Purpose:	WMM	Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	366	366	3.66	96.34	95-100
22.4	2466	2832	28.32	71.68	60-80
11.2	2561	5393	53.93	46.07	40-60
4.75	1456.0	6849	68.49	31.51	25-40
2.36	876.0	7725	77.25	22.75	15-30
0.6	826.0	8551	85.51	14.49	8.0-22.0
0.075	943.0	9494	94.94	5.06	0-8
Pan	506.0	10000			
Total	10000.0				

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Consultant's Representative

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bengaluru Mahanagara Palike
Consultant	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	Maruthinagar 8th cross Rd	**Date of Sampling**	24-08-2021
		Date of Testing	25-08-2021

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	651	89	523	83
16.0	12.5	1152	114	1005	117
12.5	10.0	747	62	721	55
10.0	6.3	625	60	559	41
Total		**3175**	**325**	**2808**	**296**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.24
Elongation Index(%):	10.54
Combined FI+EL (%)	20.78

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

TEJUS CONSULTANTS

Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bengaluru Mahanagara Palike
Consultant	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	Maruthinagar 10th cross Rd	**Date of Sampling**	27-08-2021
		Date of Testing	28-08-2021

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	656	89	523	83
16.0	12.5	1152	114	1005	117
12.5	10.0	747	62	721	55
10.0	6.3	625	60	559	41
Total		**3180**	**325**	**2808**	**296**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.22
Elongation Index(%):	10.54
Combined FI+EL (%)	20.76

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4. The material used in the site satisfied the standard of MORTH's 5th revision and hence can be used in the work.

Consultant's Representative

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TEJUS

GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	29-08-2021
Type of Mix	:	WMM
Sample I/D	:	WMM 5

Sample Location:	Maruthinagar 9th cross Rd	Date of Sampling:	28-08-2021
		Date of testing:	29-08-2021
Type of material & Purpose:	WMM	Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	378	378	3.78	96.22	95-100
22.4	2462	2840	28.40	71.60	60-80
11.2	2564	5404	54.04	45.96	40-60
4.75	1439.0	6843	68.43	31.57	25-40
2.36	889.0	7732	77.32	22.68	15-30
0.6	820.0	8552	85.52	14.48	8.0-22.0
0.075	963.0	9515	95.15	4.85	0-8
Pan	485.0	10000			
Total	10000.0				

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ಸಹಾಯಕ ಅಭಿಯಂತರರು
ಬಿ.ಬಿ.ಎಂ.ಪಿ ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ

Consultant's Representative

ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಭಿಯಂತರರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬಿ.ಬಿ.ಎಂ.ಪಿ., ಬೆಂಗಳೂರು-26

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TEJUS

GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement to Drains and Asphalting to Roads at Nadig Layout Main Road and cross Road in Ward No.(90Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Renaka Developers & Project Pvt Ltd
Date of Testing	:	01-09-2021
Type of Mix	:	WMM
Sample I/D	:	WMM 6

Sample Location:	Maruthinagar 10th cross Rd	Date of Sampling:	31-08-2021
		Date of testing:	01-09-2021
Type of material & Purpose:	WMM	Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	358	358	3.58	96.42	95-100
22.4	2441	2799	27.99	72.01	60-80
11.2	2566	5365	53.65	46.35	40-60
4.75	1436.0	6801	68.01	31.99	25-40
2.36	870.0	7671	76.71	23.29	15-30
0.6	822.0	8493	84.93	15.07	8.0-22.0
0.075	949.0	9442	94.42	5.58	0-8
Pan	558.0	10000			
Total	10000.0				

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Consultant's Representative

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TEJUS

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)			
Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thamsandra). Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Date of Testing	03-09-2021		
Layer no. or level	WMM I layer		
Depth of hole	250mm		
Field density:	**1**	**2**	**3**
Chainage	**6th cross(Amba Bhavani Temple Road) '@45**	**6th cross(Amba Bhavani Temple Road) '@106**	**6th cross(Amba Bhavani Temple Road) '@128**
Wt. of wet material from hole (Ww) gms.	6236	6147	6155
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9712	9725	9752
Wt. of sand in cone (w3) gms.	826	841	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3462	3434	3412
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.36	2.36	2.36
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.10	2.10	2.10
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.52	98.55	98.56
Compaction Required	98%	98%	98%

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Authorised Signatory

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TEJUS

GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.66(Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt Ltd
Date of Testing	:	05-11-2021
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	Thanisandra cross Roads(Soudemandi, mamatha scaning road)	**Date of Sampling:**	04-11-2021
		Date of testing:	05-11-2021
Type of material & Purpose:	WMM	**Oven Dry Wt.(gms):**	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	369	369	3.69	96.31	95-100
22.4	2466	2835	28.35	71.65	60-80
11.2	2536	5371	53.71	46.29	40-60
4.75	1429.0	6800	68.00	32.00	25-40
2.36	877.0	7677	76.77	23.23	15-30
0.6	822.0	8499	84.99	15.01	8.0-22.0
0.075	942.0	9441	94.41	5.59	0-8
Pan	559.0	10000			
Total	10000.0				

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Consultant's Representative

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

TEJUS

Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.086(Thanisandra) Byatarayanapura Sub Division		
Client	Bruhat Bengaluru Mahanagara Palike		
Consultant	TEJUS CONSULTANTS, Basaveshwar Nagar Bangalore		
Contractor	Benaka Developers & Project Pvt Ltd		
Proposed Use	WMM	**Date of Sampling**	04-11-2021
Sample Locati	Thanisandra cross Roads(Soudemandi mamatha swamy road)	**Date of Testing**	05-11-2021

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	367.00	368.00	351.00	
2	Wt of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	267.00	269.00	249.00	
3	Wt of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	100.00	99.00	102.00	
4	Aggregate Impact Value (%)	(Wc/Wa)*100	27.25	26.90	29.06	
5	Average Aggregate impact value	(%)	27.74			Max - 30 %

Satisfactory / Not Satisfactory

Remarks :

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bengaluru Mahanagara Palike
Consultant	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	Thanisandra cross Roads (Soudemandi, mamatha scaning road)	**Date of Sampling**	04-11-2021
		Date of Testing	05-11-2021

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	656	85	523	81
16.0	12.5	1152	114	1005	117
12.5	10.0	747	62	721	55
10.0	6.3	625	60	559	41
Total		**3180**	**321**	**2808**	**294**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.09
Elongation Index(%):	10.47
Combined FI+EL (%)	20.56

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Consultant's Representative

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bengaluru Mahanagara Palike
Consultant	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	Thanisandra Car guarage Rd	**Date of Sampling**	05-11-2021
		Date of Testing	06-11-2021

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	657	86	523	82
16.0	12.5	1152	114	1005	117
12.5	10.0	747	62	721	55
10.0	6.3	625	60	559	41
Total		**3181**	**322**	**2808**	**295**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.12
Elongation Index(%):	10.51
Combined FI+EL (%)	20.63

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Consultant's Representative

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TEJUS

GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	07-11-2021
Type of Mix	:	WMM
Sample I/D	:	WMM 2

Sample Location:	Bhuvaneshwari nagar 20th cross Rd	**Date of Sampling:**	06-11-2021
		Date of testing:	07-11-2021
Type of material & Purpose:	WMM	**Oven Dry Wt.(gms):**	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	371	371	3.71	96.29	95-100
22.4	2428	2799	27.99	72.01	60-80
11.2	2566	5365	53.65	46.35	40-60
4.75	1428.0	6793	67.93	32.07	25-40
2.36	877.0	7670	76.70	23.30	15-30
0.6	828.0	8498	84.98	15.02	8.0-22.0
0.075	946.0	9444	94.44	5.56	0-8
Pan	556.0	10000			
Total	10000.0				

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Consultant's Representative

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Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)			
Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Date of Testing	11-11-2021		
Layer no. or level	WMM I layer		
Depth of hole	250mm		
Field density:	**1**	**2**	**3**
Chainage	**Thanisandra Soudemandi Rd'@32**	**Thanisandra Soudemandi Rd'@90**	**Thanisandra Soudemandi Rd'@143**
Wt. of wet material from hole (Ww) gms.	6112	6136	6134
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9778	9718	9755
Wt. of sand in cone (w3) gms.	826	841	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3396	3441	3409
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.36	2.35	2.36
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.10	2.09	2.09
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.43	98.18	98.31
Compaction Required	98%	98%	98%

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Authorised Signatory

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CONSULTANTS

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)			
Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Date of Testing	11-11-2021		
Layer no. or level	WMM I layer		
Depth of hole	250mm		
Field density:	**1**	**2**	**3**
Chainage	**Thanisandra Car guarage Rd '@35**	**Thanisandra Car guarage Rd '@95**	**Thanisandra Car guarage Rd '@144**
Wt. of wet material from hole (Ww) gms.	6136	6182	6205
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9774	9701	9721
Wt. of sand in cone (w3) gms.	826	841	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3400	3458	3443
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.36	2.36	2.36
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.10	2.10	2.10
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.70	98.43	98.46
Compaction Required	98%	98%	98%

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Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)			
Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Date of Testing	12-11-2021		
Layer no. or level	WMM I layer		
Depth of hole	250mm		
Field density:	**1**	**2**	**3**
Chainage	**Mamatha Scanning Rd'@42**	**Mamatha Scanning Rd'@101**	**Mamatha Scanning Rd'@152**
Wt. of wet material from hole (Ww) gms.	6125	6136	6182
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9773	9746	9725
Wt. of sand in cone (w3) gms.	826	841	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3401	3413	3439
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.36	2.37	2.35
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.10	2.11	2.09
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.50	98.98	98.21
Compaction Required	98%	98%	98%

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4.The material used in the site satisfied the standard of MORTH's 5th revision and hence can be used in the work.

Authorised Signatory

TEJUS CONSULTANTS
No. 58, 3rd main, 6th Cross, 1st Stage KHB Colony, Basaveshwaranagar, Bangalore - 560079. O : +91 80 23287532, tejusconsultants@gmail.com

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TEJUS

Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)			
Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Date of Testing	12-11-2021		
Layer no. or level	WMM I layer		
Depth of hole	250mm		
Field density:	**1**	**2**	**3**
Chainage	**Buvaneshawari nagar 20th cross '@160**	**Buvaneshawari nagar 20th cross Road '@200**	**Jaffer Sadique Masjid opp.road '@80**
Wt. of wet material from hole (Ww) gms.	6164	6182	6123
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9760	9711	9766
Wt. of sand in cone (w3) gms.	826	841	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3414	3448	3398
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.37	2.37	2.36
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.10	2.10	2.10
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.75	98.71	98.45
Compaction Required	98%	98%	98%

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TEJUS

GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	17-11-2021
Type of Mix	:	WMM
Sample I/D	:	WMM 3

Sample Location:	6th cross(Amba Bhavani Temple Road)	**Date of Sampling:**	16-11-2021
		Date of testing:	17-11-2021
Type of material & Purpose:	WMM	**Oven Dry Wt.(gms):**	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	381	381	3.81	96.19	95-100
22.4	2464	2845	28.45	71.55	60-80
11.2	2564	5409	54.09	45.91	40-60
4.75	1426.0	6835	68.35	31.65	25-40
2.36	879.0	7714	77.14	22.86	15-30
0.6	836.0	8550	85.50	14.50	8.0-22.0
0.075	869.0	9419	94.19	5.81	0-8
Pan	581.0	10000			
Total	10000.0				

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Consultant's Representative

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	Bruhat Bengaluru Mahanagara Palike		
Consultant	TEJUS CONSULTANTS, Basaveshwar Nagar Bangalore		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Proposed Use	WMM	**Date of Sampling**	16-11-2021
Sample Locati	6th cross(Amba Bhavani Temple Road)	**Date of Testing**	17-11-2021

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	364.00	368.00	352.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	267.00	269.00	263.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	97.00	99.00	89.00	
4	Aggregate Impact Value (%)	(Wc/Wa)*100	26.65	26.90	25.28	
5	Average Aggregate impact value	(%)	26.28			Max - 30 %

Remarks : ✓ Satisfactory / Not Satisfactory

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ಸಹಾಯಕ ಅಧಿಕಾರಿಗಳು
ಬಿ.ಬಿ.ಎಂ.ಪಿ ವ್ಯಾಪ್ತಿಯ ಯಲಹಂಕ ವಲಯ

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ಸಹಾಯಕ ಕಾರ್ಯಪಾಲಕ ಅಧಿಕಾರಿಗಳು
ವ್ಯಾಪ್ತಿಯ ಯಲಹಂಕ ವಲಯ
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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bengaluru Mahanagara Palike
Consultant	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	6th cross (Amba Bhavani Temple Road)	**Date of Sampling**	16-11-2021
		Date of Testing	17-11-2021

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	653	82	523	82
16.0	12.5	1152	114	1005	117
12.5	10.0	747	62	721	55
10.0	6.3	625	60	559	41
Total		**3177**	**318**	**2808**	**295**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.01
Elongation Index(%):	10.51
Combined FI+EL (%)	20.52

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Consultant's Representative

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

TEJUS

Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	Bruhat Bengaluru Mahanagara Palike		
Consultant	TEJUS CONSULTANTS, Basaveshwar Nagar Bangalore		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Proposed Use	WMM	**Date of Sampling**	10-12-2021
Sample Locati	**Sadique Layout Mn rd**	**Date of Testing**	11-12-2021

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	360.00	337.00	348.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	271.00	255.00	263.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	89.00	82.00	85.00	
4	Aggregate Impact Value (%)	(Wc/Wa)*100	24.72	24.33	24.43	
5	Average Aggregate impact value	(%)	24.49			Max - 30 %

Remarks : Satisfactory / Not Satisfactory

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	11-12-2021
Type of Mix	:	WMM
Sample I/D	:	WMM 7

Sample Location:	Sadiq Layout Main Road	Date of Sampling:	10-12-2021
		Date of testing:	11-12-2021
Type of material & Purpose:	WMM	Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	359	359	3.59	96.41	95-100
22.4	2466	2825	28.25	71.75	60-80
11.2	2569	5394	53.94	46.06	40-60
4.75	1436.0	6830	68.30	31.70	25-40
2.36	877.0	7707	77.07	22.93	15-30
0.6	817.0	8524	85.24	14.76	8.0-22.0
0.075	944.0	9468	94.68	5.32	0-8
Pan	532.0	10000			
Total	10000.0				

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bengaluru Mahanagara Palike
Consultant	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt Ltd.

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	Sadiq Layout Main Rd	**Date of Sampling**	10-12-2021
		Date of Testing	11-12-2021

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	653	85	523	85
16.0	12.5	1152	114	1005	117
12.5	10.0	747	62	721	55
10.0	6.3	625	60	559	41
Total		**3177**	**321**	**2808**	**298**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.10
Elongation Index(%):	10.61
Combined FI+EL (%)	20.72

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TEJUS

GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	12-12-2021
Type of Mix	:	WMM
Sample I/D	:	WMM 8

Sample Location:	Sadiq Layout Main Road	**Date of Sampling:**	11-12-2021
		Date of testing:	12-12-2021
Type of material & Purpose:	WMM	**Oven Dry Wt.(gms):**	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	363	363	3.63	96.37	95-100
22.4	2466	2829	28.29	71.71	60-80
11.2	2536	5365	53.65	46.35	40-60
4.75	1469.0	6834	68.34	31.66	25-40
2.36	875.0	7709	77.09	22.91	15-30
0.6	820.0	8529	85.29	14.71	8.0-22.0
0.075	964.0	9493	94.93	5.07	0-8
Pan	507.0	10000			
Total	10000.0				

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Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)			
Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Date of Testing	16-12-2021		
Layer no. or level	WMM I layer		
Depth of hole	250mm		
Field density:	**1**	**2**	**3**
Chainage	**Sadiq Layout Main Road '@49.7(LHS)**	**Sadiq Layout Main Road '@170(LHS)**	**Sadiq Layout Main Road '@264(LHS)**
Wt. of wet material from hole (Ww) gms.	6134	6142	6125
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9775	9740	9755
Wt. of sand in cone (w3) gms.	826	841	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3399	3419	3409
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.36	2.37	2.35
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.10	2.11	2.09
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.70	98.91	98.16
Compaction Required	98%	98%	98%

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ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No 06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bengaluru Mahanagara Palike
Consultant	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Type of Material	BC		**Proposed Use**	BC
Sample Location	At plant		**Date of Sampling**	17-12-2021
			Date of Testing	17-12-2021

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	958	85	930	73
16.0	12.5	1315	114	1250	125
12.5	10.0	518	76	444	52
10.0	6.3	495	64	433	62
Total		**3286**	**339**	**3057**	**312**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.32
Elongation Index(%):	10.21
Combined FI+EL (%)	20.52

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Consultant's Representative

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Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)			
Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Date of Testing	17-12-2021		
Layer no. or level	WMM I layer		
Depth of hole	250mm		
Field density:	**1**	**2**	**3**
Chainage	**Sadiq Layout Main Road '@321(LHS)**	**Sadiq Layout Main Road '@387(LHS)**	**Sadiq Layout Main Road '@418(LHS)**
Wt. of wet material from hole (Ww) gms.	6118	6134	6158
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9776	9724	9764
Wt. of sand in cone (w3) gms.	826	841	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3398	3435	3400
Bulk density of sand (ys)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(ys))gm/cc	2.36	2.36	2.37
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.10	2.09	2.11
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.47	98.32	98.95
Compaction Required	98%	98%	98%

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Authorised Signatory

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Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bengaluru Mahanagara Palike
Consultant	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

AGGREGATE IMPACT VALUE (IS: 2386 Part - 4)

Proposed Use	BC	**Date of Sampling**	**17-12-2021**
Sample Location	At plant	**Date of Testing**	**17-12-2021**

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	389.00	367.00	376.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	294.00	277.00	283.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	95.00	90.00	93.00	
4	Aggregate Impact Value (%)	(Wc/Wa)*100	24.42	24.52	24.73	
5	Average Aggregate impact value	(%)	24.56			Max - 30 %

Remarks : Satisfactory / Not Satisfactory

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Consultant's Representative

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Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)			
Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Date of Testing	18-12-2021		
Layer no. or level	WMM I layer		
Depth of hole	250mm		
Field density:	**1**	**2**	**3**
Chainage	**Sadiq Layout Main Road '@160(RHS)**	**Sadiq Layout Main Road '@380(RHS)**	**Jaffer Sadique Masjid opp.road '@50**
Wt. of wet material from hole (Ww) gms.	6113	6133	6148
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9776	9745	9756
Wt. of sand in cone (w3) gms.	826	841	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3398	3414	3408
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.36	2.37	2.36
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.10	2.11	2.10
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.39	98.91	98.56
Compaction Required	98%	98%	98%

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

Name of Work	:	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	19-12-2021
Type of Mix	:	BC
Sample I/D	:	BC1

DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
1. Weight of Mixture before extraction, g	937	955
2. Weight of Mixture after extraction, g	888	905
3. Weight of Bitumen	49	50
4. Weight of filter paper before extraction, g	2.00	2.15
5. Weight of filter paper after extraction, g	4.10	4.00
6. Weight of fines, g	2.10	1.85
7. Weight of Bitumen & fines	51.10	51.85
8. Bitumen content in %	5.45	5.43
9. Average Bitumen content in %	**5.44**	
10. Minimum Bitumen content in %	**5.40**	

GRADATION FOR BC AFTER EXTRACTION

(As per MORT&H 500-18,Grading-2)

Sample Location:	6th cross(Amba Bhavani Temple Road)	Date of Sampling:	**19-12-2021**
		Date of testing:	**19-12-2021**
Type of material & Purpose:	**BC**	Oven Dry Wt.(gms):	888.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	84	84.0	9.46	90.54	79 - 100
9.50	121	205.0	23.09	76.91	71 - 95
4.75	98	303.0	34.12	65.88	53 - 71
2.360	145	448.0	50.45	49.55	42 - 58
1.180	118	566.0	63.74	36.26	34 - 48
0.600	70	636.0	71.62	28.38	26 - 38
0.300	73	709.0	79.84	20.16	18 - 28
0.150	49	758.0	85.36	14.64	12 - 20
0.075	70	828.0	93.24	6.76	4 - 10
Pan	60.0	888.0			
Total	888.0				

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Consultant's Representative

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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers & Project Pvt.Ltd.
Date of Testing :	19-12-2021
Type of Mix :	Tack coat
Sample I/D :	1
Sample Location	6th cross(Amba Bhavani Temple Road)

Determination	**Unit**	**Test No**		
		1	**2**	**3**
Chainage		**@55**	**@98**	**@132**
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.776	0.768	0.796
Final weight of plate after application of tack Coat (c)	Kg	0.799	0.791	0.819
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.023
Rate of spread of tack coat	Kg/sq.m	0.253	0.254	0.252
Average	Kg/sq.m	0.253		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

Name of Work	:	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No 06(Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt Ltd
Date of Testing	:	24-12-2021
Type of Mix	:	BC
Sample I/D	:	BC2

DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
1. Weight of Mixture before extraction, g	930	954
2. Weight of Mixture after extraction, g	881	904
3. Weight of Bitumen	49	50
4. Weight of filter paper before extraction, g	2.00	2.15
5. Weight of filter paper after extraction, g	4.10	4.00
6. Weight of fines, g	2.10	1.85
7. Weight of Bitumen & fines	51.10	51.85
8. Bitumen content in %	5.49	5.44
9. Average Bitumen content in %	**5.46**	
10. Minimum Bitumen content in %	**5.40**	

GRADATION FOR BC AFTER EXTRACTION

(As per MORT&H 500-18,Grading-2)

Sample Location:	Maruthi layout 8th, 9th cross rd	Date of Sampling:	**24-12-2021**
		Date of testing:	**24-12-2021**
Type of material & Purpose:	BC	Oven Dry Wt.(gms):	881.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	86	86.0	9.76	90.24	79 - 100
9.50	122	208.0	23.61	76.39	71 - 95
4.75	99	307.0	34.85	65.15	53 - 71
2.360	145	452.0	51.31	48.69	42 - 58
1.180	112	564.0	64.02	35.98	34 - 48
0.600	70	634.0	71.96	28.04	26 - 38
0.300	73	707.0	80.25	19.75	18 - 28
0.150	49	756.0	85.81	14.19	12 - 20
0.075	70	826.0	93.76	6.24	4 - 10
Pan	55.0	881.0			
Total	881.0				

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BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

Name of Work	:	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	24-12-2021
Type of Mix	:	BC
Sample I/D	:	BC3

DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
1. Weight of Mixture before extraction, g	945	915
2. Weight of Mixture after extraction, g	896	867
3. Weight of Bitumen	49	48
4. Weight of filter paper before extraction, g	2.00	2.15
5. Weight of filter paper after extraction, g	4.10	4.00
6. Weight of fines, g	2.10	1.85
7. Weight of Bitumen & fines	51.10	49.85
8. Bitumen content in %	5.41	5.45
9. Average Bitumen content in %	**5.43**	
10. Minimum Bitumen content in %	**5.40**	

GRADATION FOR BC AFTER EXTRACTION

(As per MORT&H 500-18,Grading-2)

Sample Location:	Maruthi layout 10th cross rd	Date of Sampling:	24-12-2021
		Date of testing:	24-12-2021
Type of material & Purpose:	**BC**	Oven Dry Wt.(gms):	896.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	89	89.0	9.93	90.07	79 - 100
9.50	124	213.0	23.77	76.23	71 - 95
4.75	95	308.0	34.38	65.63	53 - 71
2.360	119	427.0	47.66	52.34	42 - 58
1.180	115	542.0	60.49	39.51	34 - 48
0.600	99	641.0	71.54	28.46	26 - 38
0.300	61	702.0	78.35	21.65	18 - 28
0.150	54	756.0	84.38	15.63	12 - 20
0.075	90	846.0	94.42	5.58	4 - 10
Pan	50.0	896.0			
Total	896.0				

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Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)			
Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers & Project Pvt Ltd.		
Date of Testing	25-12-2021		
Layer no. or level	WMM I layer		
Depth of hole	250mm		
Field density:	1	2	3
Chainage	**Maruthi layout 8th c/s Road '@44(RHS)**	**Maruthi layout 8th c/s Road '@113(RHS)**	**Maruthi layout 8th c/s Road '@230(RHS)**
Wt. of wet material from hole (Ww) gms.	6115	6126	6146
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9774	9745	9755
Wt. of sand in cone (w3) gms.	826	841	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3400	3414	3409
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.36	2.37	2.36
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.10	2.10	2.10
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.37	98.79	98.50
Compaction Required	98%	98%	98%

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Field Dry Density test by Sand Replacement Method (As per IS 2720 (Part 28)			
Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	BRUHAT BANGALORE MAHANAGARA PALIKE		
Consultant	M/s Tejus Consultants		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Date of Testing	27-12-2021		
Layer no. or level	WMM I layer		
Depth of hole	250mm		
Field density:	1	2	3
Chainage	Maruthi layout 10th c/s Road '@66	Maruthi layout 10th c/s Road '@173	Maruthi layout 10th c/s Road '@253
Wt. of wet material from hole (Ww) gms.	6121	6132	6185
Wt. of sand+cylinder before pouring (w1) gms.	14000	14000	14000
Wt. of sand+cylinder after pouring (w2) gms.	9775	9742	9742
Wt. of sand in cone (w3) gms.	826	841	836
Wt. of sand in hole (w4)=(w1-w2-w3) gms.	3399	3417	3422
Bulk density of sand (γs)gm/cc	1.31	1.32	1.31
Bulk density of material(i.e. wt. of the wet material) (γb)=(Ww/w4*(γs))gm/cc	2.36	2.37	2.37
Moisture meter reading(moisture content)	12.45	12.56	12.57
Result			
FDD(Wt.of the dry material)=(100γb/100+mc)gm/cc	2.10	2.10	2.10
MDD	2.13	2.13	2.13
OMC	12.60%	12.60%	12.60%
% of Compaction Obtained	98.49	98.80	98.75
Compaction Required	98%	98%	98%

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Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bengaluru Mahanagara Palike
Consultant	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

AGGREGATE IMPACT VALUE (IS: 2386 Part - 4)

Proposed Use	DBM	**Date of Sampling**	31-01-2022
Sample Location	At plant	**Date of Testing**	31-01-2022

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	370.00	369.00	358.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	281.00	280.00	272.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	89.00	89.00	86.00	
4	Aggregate Impact Value (%)	(Wc/Wa)*100	24.05	24.12	24.02	
5	Average Aggregate impact value	(%)	24.07			Max - 30 %

Remarks : Satisfactory / Not Satisfactory

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Project	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bengaluru Mahanagara Palike
Consultant	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Type of Material	DBM		**Proposed Use**	**DBM**
Sample Location	At plant		**Date of Sampling**	**31-01-2022**
			Date of Testing	**31-01-2022**

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	7842	670	7011	382
31.5	25.0	4220	237	3520	296
25.0	20.0	2456	242	1998	227
20.0	16.0	1556	332	988	256
16.0	12.5	579	102	460	197
12.5	10.0	482	67	268	90
10.0	6.3	132	91	81	60
Total		**17267**	**1741**	**14326**	**1508**

Results

Flakiness Index(%):	10.08
Elongation Index(%):	10.53
Combined FI+EL (%)	20.61

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TEJUS

BITUMEN CONTENT AND GRADATION DETERMINATION OF DENSE BITUMINOUS MACADAM MIX

Name of Work	:	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No 06(Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt Ltd
Date of Testing	:	02-02-2022
Type of Mix	:	DBM
Sample I/D	:	DBM-1

DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
1. Weight of Mixture before extraction, g	853	922
2. Weight of Mixture after extraction, g	816	882
3. Weight of Bitumen	37	40
4. Weight of filter paper before extraction, g	2.00	2.00
5. Weight of filter paper after extraction, g	4.00	4.00
6. Weight of fines, g	2.00	2.00
7. Weight of Bitumen & fines	39.00	42.00
8. Bitumen content in %	4.57	4.56
9. Average Bitumen content in %	4.56	
10. Minimum Bitumen content in %	4.50	

GRADATION FOR DBM AFTER EXTRACTION

(As per MORT&H 500-10,Grading-2)

Sample Location:	Sadiq Layout Main Road	**Date of Sampling:**	02-02-2022
		Date of testing:	02-02-2022
Type of material & Purpose:	DBM	**Oven Dry Wt.(gms):**	816

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
37.50	0.0	0.0	0.00	100.00	100.00
26.50	40.0	40.0	4.90	95.10	90-100
19.00	126.0	166.0	20.34	79.66	71-95
13.20	112.0	278.0	34.07	65.93	56-80
4.750	154.0	432.0	52.94	47.06	38-54
2.360	98.0	530.0	64.95	35.05	28-42
0.300	176.0	706.0	86.52	13.48	7-21
0.075	64.0	770.0	94.36	5.64	2-8
Pan	46.0	816.0			
Total	816.0				

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Consultant's Representative

TEJUS CONSULTANTS
No. 58, 3rd main, 6th Cross, 1st Stage KHB Colony, Basaveshwaranagar, Bangalore - 560079. O : +91 80 23287532, tejusconsultants@gmail.com

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TEJUS

BITUMEN CONTENT AND GRADATION DETERMINATION OF DENSE BITUMINOUS MACADAM MIX

Name of Work	:	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	02-02-2022
Type of Mix	:	DBM
Sample I/D	:	DBM-2

DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
1. Weight of Mixture before extraction, g	874	936
2. Weight of Mixture after extraction, g	836	895
3. Weight of Bitumen	38	41
4. Weight of filter paper before extraction, g	2.00	2.00
5. Weight of filter paper after extraction, g	4.00	4.00
6. Weight of fines, g	2.00	2.00
7. Weight of Bitumen & fines	40.00	43.00
8. Bitumen content in %	4.58	4.59
9. Average Bitumen content in %	4.59	
10. Minimum Bitumen content in %	4.50	

GRADATION FOR DBM AFTER EXTRACTION

(As per MORT&H 500-10,Grading-2)

Sample Location:	Sadiq Layout Main Road	**Date of Sampling:**	02-02-2022
		Date of testing:	02-02-2022
Type of material & Purpose:	DBM	**Oven Dry Wt.(gms):**	836

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
37.50	0.0	0.0	0.00	100.00	100.00
26.50	45.0	45.0	5.38	94.62	90-100
19.00	129.0	174.0	20.81	79.19	71-95
13.20	109.0	283.0	33.85	66.15	56-80
4.750	160.0	443.0	52.99	47.01	38-54
2.360	99.0	542.0	64.83	35.17	28-42
0.300	145.0	687.0	82.18	17.82	7-21
0.075	94.0	781.0	93.42	6.58	2-8
Pan	55.0	836.0			
Total	836.0				

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Consultant's Representative

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TEJUS

DETERMINATION OF RATE OF SPREAD TACK COAT				
Name of Work :	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division			
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE			
Consultant :	M/s Tejus Consultants			
Contractor :	Benaka Developers & Project Pvt.Ltd.			
Date of Testing :	02-02-2022			
Type of Mix :	Tack coat			
Sample I/D :	1			
Sample Location	Sadiq Layout Main Road			
Determination	Unit	Test No		
		1	2	3
Chainage		@53	@105	@213
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.788	0.756	0.774
Final weight of plate after application of tack Coat (c)	Kg	0.811	0.779	0.797
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.023
Rate of spread of tack coat	Kg/sq.m	0.252	0.251	0.253
Average	Kg/sq.m	0.252		
Specified Limit	Kg/sq.m	0.250 Kg/sq.m		

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Consultant's Representative

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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers & Project Pvt.Ltd.
Date of Testing :	02-02-2022
Type of Mix :	Tack coat
Sample I/D :	2
Sample Location	Sadiq Layout Main Road

Determination	**Unit**	**Test No**		
		1	**2**	**3**
Chainage		**@210**	**@364**	**@402**
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.760	0.762	0.778
Final weight of plate after application of tack Coat (c)	Kg	0.783	0.785	0.801
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.023
Rate of spread of tack coat	Kg/sq.m	0.252	0.253	0.253
Average	Kg/sq.m	0.253		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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ಸಹಾಯಕ ಅಭಿಯಂತರರು
ಬಿ.ಬಿ.ಎಂ.ಪಿ ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ

ಸಹಾಯಕ ಆಯುಕ್ತರು
ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
ಬಿ.ಬಿ.ಎಂ.ಪಿ., ಬೆಂಗಳೂರು-26

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TEJUS

BITUMEN CONTENT AND GRADATION DETERMINATION OF BITUMINOUS CONCRETE MIX

Name of Work	:	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	07-02-2022
Type of Mix	:	BC
Sample I/D	:	BC4

DETERMINATION OF BITUMEN CONTENT

Description	Trail 1	Trail 2
1. Weight of Mixture before extraction, g	938	953
2. Weight of Mixture after extraction, g	889	903
3. Weight of Bitumen	49	50
4. Weight of filter paper before extraction, g	2.00	2.15
5. Weight of filter paper after extraction, g	4.10	4.00
6. Weight of fines, g	2.10	1.85
7. Weight of Bitumen & fines	51.10	51.85
8. Bitumen content in %	5.45	5.44
9. Average Bitumen content in %	**5.44**	
10. Minimum Bitumen content in %	**5.40**	

GRADATION FOR BC AFTER EXTRACTION

(As per MORT&H 500-18,Grading-2)

Sample Location:	Sadiq Layout Main Road	Date of Sampling:	**07-02-2022**
		Date of testing:	**07-02-2022**
Type of material & Purpose:	**BC**	Oven Dry Wt.(gms):	889.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
19.00	0	0	0.00	100.00	100.00
13.20	85	85.0	9.56	90.44	79 - 100
9.50	122	207.0	23.28	76.72	71 - 95
4.75	99	306.0	34.42	65.58	53 - 71
2.360	152	458.0	51.52	48.48	42 - 58
1.180	115	573.0	64.45	35.55	34 - 48
0.600	70	643.0	72.33	27.67	26 - 38
0.300	73	716.0	80.54	19.46	18 - 28
0.150	49	765.0	86.05	13.95	12 - 20
0.075	73	838.0	94.26	5.74	4 - 10
Pan	51.0	889.0			
Total	889.0				

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ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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DETERMINATION OF RATE OF SPREAD TACK COAT

Name of Work :	Improvement to Drains and Asphalting to Roads at Sadiq Layout Main Road and cross Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client :	BRUHAT BANGALORE MAHANAGARA PALIKE
Consultant :	M/s Tejus Consultants
Contractor :	Benaka Developers & Project Pvt.Ltd.
Date of Testing :	07-02-2022
Type of Mix :	Tack coat
Sample I/D :	4
Sample Location	Sadiq Layout Main Road

Determination	**Unit**	**Test No**		
		1	**2**	**3**
Chainage		**@108**	**@268**	**@417**
Size of Plate (mxm)	Mt	0.30 x .30	0.30 x .30	0.30 x .30
Area of Plate (a)	Sq.mtr	0.09	0.09	0.09
Initial Wt of empty Plate (b)	Kg	0.766	0.739	0.751
Final weight of plate after application of tack Coat (c)	Kg	0.789	0.762	0.774
Weight of tack Coat (d=c-b)	Kg	0.023	0.023	0.023
Rate of spread of tack coat	Kg/sq.m	0.252	0.253	0.254
Average	Kg/sq.m	0.253		
Specified Limit	Kg/sq.m	**0.250 Kg/sq.m**		

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Authorised Signatory

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TEJUS

TEST REPORT

Clients	BRUHAT BENGALORE MAHANAGARA PALIKE
Project	Improvement to Drains and Asphalting to Road at SVN School Road Krishnappa House to Venkatesh House Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

SPECIFIC GRAVITY AND WATER ABSORPTION

FINE AGGREGATE (IS-2386-PART-3)

Type of Material	M sand	Proposed Use	concrete
Location/Source	Krishnappa House road	Date of Sampling	04-12-2020
Period of Soaking	24 hours	Date of Testing	05-12-2020

Sl. No.	Test Property	TRIAL - 1	TRIAL - 2	TRIAL - 3	
A	Weight of sturated surface dry sample gm.	648	650	658	
B	Weight of oven - dry sample gm.	640	642	648	
C	Weight of Pycnometer Filled with water gm	1275	1275	1275	
D	Weight of Pycnometer + sample + water gm	1682	1683	1690	
E	Bulk specific gravity $\frac{B}{(C+A-D)}$	2.656	2.653	2.667	2.658
G	Absorption (%) $\frac{(A-B)*100}{B}$	1.250	1.246	1.543	1.346

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TEJUS

Test Report on Cement

Project	Improvement to Drains and Asphalting to Road at SVN School Road Krishnappa House to Venkatesh House Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bangalore Mahanagar Palike
Consultant	TEJUS CONSULTANTS
Contractor	Benaka Developers & Project Pvt.Ltd.
Sample ID	Cement (ACC Cement) OPC 43 Grade
Date of Sample Tested	05-12-2020
Sample Supplied By	Agency

Sl.No.	Descriptions	Test Method as per IS	Test Result	Requirements as per IS: 12269-1987
1	a) Initial Setting Time	IS-4031 (Part-5)	106 Minutes	Not Less than 30 Minutes
	b) Final Setting Time	IS-4031 (Part-5)	384 Minutes	Not More than 600 Minutes
2	Soundness	IS-4031 (Part-3) By the Le-Chatelier method	5mm	Not More than 10 mm
3	Standard Consistency	IS-4031 (Part-4)	29.00%	25 % to 35

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike
Project	Improvement to Drains and Asphalting to Road at SVN School Road Krishnappa House to Venkatesh House Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Consultants	TEJUS CONSULTANTS
Contractor	Benaka Developers & Project Pvt.Ltd.
Total Weight:	10000 gms

SIEVE ANALYSIS

Type of Material	12.5 mm down size	Proposed Use	CONCRETE
Sample Location	Krishnappa House road	Date of Sampling	05-12-2020
		Date of Testing	05-12-2020

IS Sieve Size (in mm)	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing
20.0	0	0	0	100	100
12.5	506	506	5.06	94.94	90-100
10.0	4596	5102	51.02	48.98	40-85
4.75	4432	9534	95.34	4.66	0-10
Pan	466	10000			

Remarks : ✓ Satisfactory / Not Satisfactory

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike
Project	Improvement to Drains and Asphalting to Road at SVN School Road Krishnappa House to Venkatesh House Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.
Total Weight:	10000 gms

SIEVE ANALYSIS

Type of Material	20 mm down size	**Proposed Use**	Concrete
Sample Location	Krishnappa House road	**Date of Sampling**	05-12-2020
		Date of Testing	05-12-2020

IS Sieve Size	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing
40.00 mm	0	0	0	100	100
20.00 mm	268	268	2.68	97.32	95 - 100
10.00 mm	4838	5106	51.06	48.94	25 - 55
4.75 mm	4222	9328	93.28	6.72	0 - 10
Pan	672	10000			

Remarks : Satisfactory / Not Satisfactory

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike
Project	Improvement to Drains and Asphalting to Road at SVN School Road Krishnappa House to Venkatesh House Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Consultants	Tejus Consultants, Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

SIEVE ANALYSIS

Total Weight:	3000 gms		
Type of Material	M sand	**Proposed Use**	concrete
Sample Location	Krishnappa House road	**Date of Sampling**	05-12-2020
		Date of Testing	05-12-2020

IS Sieve Size	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing (Zone-II)
10.00 mm	0	0	0	100.00	100
4.75 mm	224	224	7.47	92.53	90 - 100
2.36 mm	312	536	17.87	82.13	75 - 100
1.18 mm	422	958	31.93	68.07	55 - 90
0.600 mm	492	1450	48.33	51.67	35 -59
0.300 mm	714	2164	72.13	27.87	8-30
0.150 mm	646	2810	93.67	6.33	0 - 10
Pan	190	3000			-

Remarks : ✓ Satisfactory / Not Satisfactory

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PRECAST SLAB (CORE) TEST REPORT

Client	:	Bruhat Bangalore Mahanagara Palike
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Name of Work	:	Improvement to Drains and Asphalting to Road at SVN School Road Krishnappa House to Venkatesh House Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
No.of Sample Tested	:	3
Date of Testing	:	07-12-2020
Techinical Reference	:	IS:516-1959 (Reaffirmed 1999), SP-24:1983.
Grade of Concrete	:	M20_250mm Thick

Sl.No.	Dia of Core D (mm)	Height of Core H (mm)	Core Wt (Kg)	Density of Core (kg / m^3)	H / D	Correction factor (Based on H/D)	Failure Load (KN)	Core Strength (N/mm^2)	Correction Factor for the Dia. (Strength of the Core x 1.08)	Corrected Cylinder Compressive Strength (N/mm^2)	Equivalent Cube Compressive Strength (N/mm^2)
1	100.00	180.00	3.553	2513.23	1.80	0.960	160.00	20.37	22.00	21.12	26.40
2	100.00	180.00	3.533	2499.09	1.80	0.960	161.00	20.50	22.14	21.25	26.57
3	100.00	180.00	3.531	2497.67	1.80	0.960	158.00	20.12	21.73	20.86	26.07

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ಹಿರಿಯ ಅಧಿಕಾರಿಗಳವರು
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Consultant's Representative

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AGGREGATE IMPACT VALUE
(IS: 2386 Part - 4)

TEJUS CONSULTANTS

Project	Improvement to Drains and Asphalting to Road at SVN School Road Krishnappa House to Venkatesh House Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division		
Client	Bruhat Bengaluru Mahanagara Palike		
Consultant	TEJUS CONSULTANTS, Basaveshwar Nagar Bangalore		
Contractor	Benaka Developers & Project Pvt.Ltd.		
Proposed Use	WMM	Date of Sampling	05-02-2021
Sample Locati	1st Main (SVN school road)	Date of Testing	05-02-2021

Sl. No.	Description		Test No. 1	Test No. 2	Test No. 3	Spec Limit (%)
1	Wt. of stone pieces (dry) passing IS Sieve 12.5mm but retained in IS sieve 10mm (gm)	(Wa)	366.00	368.00	351.00	
2	Wt. of the fraction retained in IS sieve 2.36mm after the impact test (gm)	(Wb)	269.00	270.00	258.00	
3	Wt. of the fraction passed in IS sieve 2.36mm after the impact test (gm)	(Wc)	97.00	98.00	93.00	
4	Aggregate Impact Value (%)	(Wc/Wa)*100	26.50	26.63	26.50	
5	Average Aggregate impact value	(%)	26.54			Max - 30 %

Remarks : Satisfactory / Not Satisfactory

Note:

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Authorised Signatory

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FLAKINESS AND ELONGATION INDICES (IS 2386, PART 1)

Project	Improvement to Drains and Asphalting to Road at SVN School Road Krishnappa House to Venkatesh House Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	Bruhat Bengaluru Mahanagara Palike
Consultant	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

Type of Material	WMM	**Proposed Use**	WMM
Sample Location	1st Main (SVN school road)	**Date of Sampling**	05.02.2021
		Date of Testing	05.02.2021

Size of aggregate		**Flakiness Index**		**Elongation Index**	
Passing through IS sieve, mm	**Retained on IS sieve, mm**	**Total wt. of aggregate retained on sieves (A) gms.**	**Wt. of aggregate passing from Flakiness gauge (B) gms**	**Wt. of aggregate retained on Flakiness gauge (C) gms**	**Wt. of aggregate retained on Elongation gauge after retained on Flakiness gauge(D)gms**
63.0	50.0	0	0	0	0
50.0	40.0	0	0	0	0
40.0	31.5	0	0	0	0
31.5	25.0	0	0	0	0
25.0	20.0	0	0	0	0
20.0	16.0	654	85	523	81
16.0	12.5	1152	114	1005	117
12.5	10.0	747	62	721	55
10.0	6.3	625	60	559	41
Total		**3178**	**321**	**2808**	**294**

Note: Minimum 200 Pcs should be taken on each fraction of test

Flakiness Index(%):	10.10
Elongation Index(%):	10.47
Combined FI+EL (%)	20.57

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Consultant's Representative

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GRADATION FOR WMM
(As per MORT&H 400-11)

Name of Work	:	Improvement to Drains and Asphalting to Road at SVN School Road Krishnappa House to Venkatesh House Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Client	:	Bruhat Bengaluru Mahanagara Palike
Consultant	:	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	:	Benaka Developers & Project Pvt.Ltd.
Date of Testing	:	05.02.2021
Type of Mix	:	WMM
Sample I/D	:	WMM 1

Sample Location:	1st Main (SVN school road)	Date of Sampling:	05.02.2021
		Date of testing:	05.02.2021
Type of material & Purpose:	WMM	Oven Dry Wt.(gms):	10000.0

IS Sieve size in mm	Weight retained	Cummulative weight retained (gm)	Cummulative % of retained	Cummulative % of passing	Specification limits
53	0	0	0.00	100.00	100.00
45	358	358	3.58	96.42	95-100
22.4	2485	2843	28.43	71.57	60-80
11.2	2587	5430	54.30	45.70	40-60
4.75	1457.0	6887	68.87	31.13	25-40
2.36	885.0	7772	77.72	22.28	15-30
0.6	821.0	8593	85.93	14.07	8.0-22.0
0.075	941.0	9534	95.34	4.66	0-8
Pan	466.0	10000			
Total	10000.0				

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ಬಿ.ಬಿ.ಎಂ.ಪಿ ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ

Consultant's Representative

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ಬ್ಯಾಟರಾಯನಪುರ ಉಪ ವಿಭಾಗ
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TEST REPORT

Clients	Bruhath Bangalore Mahanagara Palike
Project	Improvement to Drains and Asphalting to Road at SVN School Road Krishnappa House to Venkatesh House Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Consultants	TEJUS CONSULTANTS Basaveshwar Nagar Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.
Total Weight in gm:	3000

SIEVE ANALYSIS

Type of Material	40 mm down size	**Proposed Use**	PCC
Sample Location	Krishnappa House road	**Date of Sampling**	09-02-2021
		Date of Testing	10-02-2021

IS Sieve Size	Weight Retained in gm	Cum. Weight Retained in gm	Cumulative Weight Retained in %	Cumulative Weight Passing in %	Specific Limits as per IS 383-1970 (RA-2007) % of Passing For Graded Aggregate of Nominal Size
80.00mm	0	0	0.00	100.00	100
63.00mm	0	0	0.00	100.00	-
40.00mm	86	86	2.87	97.13	95-100
20.00mm	1402	1488	49.60	50.40	30-70
10.00mm	966	2454	81.80	18.20	10-35
4.75mm	436	2890	96.33	3.67	0-5
Pan	110	3000	100.00	0.00	

Remarks : ✓ Satisfactory / Not Satisfactory

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TEST REPORT

Clients	Bruhat Bangalore Mahanagara Palike
Project	Improvement to Drains and Asphalting to Road at SVN School Road Krishnappa House to Venkatesh House Road in Ward No.06(Thanisandra), Byatarayanapura Sub Division
Consultants	Tejus Consultants, Bangalore
Contractor	Benaka Developers & Project Pvt.Ltd.

SIEVE ANALYSIS

Total Weight:	3000 gms		
Type of Material	M sand	Proposed Use	PCC
Sample Location	Krishnappa house road	Date of Sampling	09-02-2021
		Date of Testing	10-02-2021

IS Sieve Size	Weight Retained	Cum. Weight Retained	Cum. % Retained	Cum. % Passing	Spec. Limit (%) Passing (Zone-II)
10.00 mm	0	0	0	100.00	100
4.75 mm	224	224	7.47	92.53	90 - 100
2.36 mm	318	542	18.07	81.93	75 - 100
1.18 mm	425	967	32.23	67.77	55 - 90
0.600 mm	470	1437	47.90	52.10	35 -59
0.300 mm	754	2191	73.03	26.97	8-30
0.150 mm	655	2846	94.87	5.13	0 - 10
Pan	154	3000			-

Remarks : Satisfactory / Not Satisfactory

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